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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,353	04/02/2004	James B.Y. Tsui	AFD 672	9868

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EXAMINER	
DO, CHAT C	

ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

AK

Office Action Summary	Application No.	Applicant(s)
	10/816,353	TSUI ET AL.
	Examiner	Art Unit
	Chat C. Do	2193

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 16-20* is/are rejected.

7)☒ Claim(s) *14 and 15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This communication is responsive to Amendment filed 11/01/2007.

2. Claims 1-20 are pending in this application. Claims 1, 10, and 19-20 are independent claims. This Office Action is made final.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 1, the term "can be" in line 2 page 4 is a relative term which renders the claim indefinite. The term "can be" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Thus, claims 2-9 are also rejected for being dependent on the rejected base claim 1.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-2, 5, 8-13, and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over White (U.S. 5,233,551) in view of Tsui et al. (U.S. 5,963,164).

Re claim 1, White discloses in Figures 4-15 the limited mechanization complexity method of analyzing input frequency signals (e.g. X as input into FFT), said method comprising the steps of: generating an approximation Fourier transformation of successive segments of said input frequency signals (e.g. expression 1 in column 6); said approximation Fourier transformation segments including individual Fourier series terms having real magnitude and imaginary magnitude coefficients generated by multiplication of input signal determined coefficients by selected approximated Fourier transformation Kernel function coefficients (e.g. Figure 8 with Kernel function coefficients and col. 8 lines 50-62); said selected approximated Fourier transformation Kernel function coefficients including both integral unit and integral multiple unit possible component magnitudes over a real and imaginary value complex plane grid and defining a circular trajectory Kernel function location pattern over said real and imaginary value complex plane grid (e.g. Figure 8 as complex grid plane with horizontal axis is real correspondent and vertical axis is imaginary correspondent); said selected approximated Fourier transformation Kernel function locations being dispersed in substantially equal angular

increments around said defined circular trajectory Kernel function location pattern on said real and imaginary value complex plane grid (e.g. Figures 5 and 8 wherein each point is located equally along the circle with an angle is determined by a cycle over total number of coefficients); generating said individual Fourier series terms from said input signal determined coefficients and from said Fourier transformation Kernel function coefficients having real magnitude and imaginary magnitude coefficients using a bit shift multiplication algorithm inclusive of multiple shift and add/subtract algorithm components (e.g. Figure 8 and col. 4 lines 3-15 wherein the multiplication is replace with shift-add for reducing complexity); said selected approximated Fourier transformation Kernel function locations being dispersed in an annular space inclusive of said circular trajectory on said real and imaginary value complex plane grid and being optimized with respect to including integral numeric values compatible with said bit shift multiplication algorithm having multiple shift and add/subtract algorithm components (e.g. col. 4 lines 3-15 and abstract and Figures 5-8, and col. 15 lines 10-20).

White fails to disclose in Figures 5-15 that the signal is radio frequency signals in a radio receiver whereby enhanced multiple radio frequency signal dynamic range and simplified kernel function implementation characteristics can be selected in said radio frequency radio receiver.

However, Tsui et al. disclose in Figure 2 the FFT is applied to radio frequency signals (e.g. abstract) that the signal is radio frequency signals in a radio receiver whereby enhanced multiple radio frequency signal dynamic range and simplified kernel

function implementation characteristics can be selected in said radio frequency radio receiver (e.g. col. 2 lines 30-57).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to applied that the signal is radio frequency signals in a radio receiver whereby enhanced multiple radio frequency signal dynamic range and simplified kernel function implementation characteristics can be selected in said radio frequency radio receiver as seen in Tsui et al.'s invention into White's invention because it would enable to detecting and identifying incoming multiple signals from gigahertz radio frequency range (e.g. abstract and col. 2 lines 17-28).

Re claim 2, White further discloses in Figures 4-15 selected approximated Fourier transformation Kernel function locations are also optimized with respect to generation of minimal spurious responses in said Fourier transformation (e.g. Figure 8).

Re claim 5, White fails to disclose in Figures 4-15 method of analyzing comprises determining input signal component frequency and component amplitude contents of radio frequency input signals of an electronic warfare radio receiver. Howeer, Tsui et al. discloses in Figure 2 determining input signal component frequency and component amplitude contents of radio frequency input signals of an electronic warfare radio receiver (e.g. Figure 10). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made determining input signal component frequency and component amplitude contents of radio frequency input signals of an electronic warfare radio receiver as seen in Tsui et al.'s invention into White's

invention because it would enable to detecting and identifying incoming signal from gigahertz radio frequency range (e.g. abstract and col. 2 lines 17-28).

Re claim 8, White further discloses in Figures 4-15 selected approximated Fourier transformation Kernel function locations are between thirty two and two hundred fifty six in number (e.g. dependent on the need of radix-size wherein an illustration of radix-12 is disclosed in Figure 8).

Re claim 9, White further discloses in Figures 4-15 selected approximated Fourier transformation Kernel function locations are equally and symmetrically disposed in four quadrants of said complex plane grid (e.g. Figures 5 and 8 wherein the point locations are symmetric along the axis).

Re claim 10, it has similar limitations cited in claim 1. Thus, claim 10 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 11, it has similar limitations cited in claim 5. Thus, claim 11 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

Re claim 12, White further discloses in Figures 4-15 source of multiple frequency signals comprises radio frequency signals of two differing operating frequencies (e.g. inherently since any non-period signal having at least two frequencies or above).

Re claim 13, White further discloses in Figures 4-15 selected plurality of approximated Fourier transformation Kernel function locations disposed within a complex plane plot of real and imaginary values received within an annular arc of selected radial thickness overlying said plot of real and imaginary values are disposed in a closed circular annular arc (e.g. Figures 5 and 8).

Re claim 16, White further discloses in Figures 4-15 complex plane plot of real and imaginary values includes coordinate lengths of 1, 2, 4, 8, 16 and so-on units magnitude (e.g. Figure 8 wherein the magnitude is set to 1).

Re claim 17, White further discloses in Figures 4-15 complex plane plot of real and imaginary values is comprised of integral lengths, along said real and imaginary axes, enabling algorithm implementation with simple shift and add multiplication operations (e.g. Figure 8 and col. 4 lines 3-15 wherein the multiplication is replace with shift-add for reducing complexity).

Re claim 18, White further discloses in Figures 4-15 complex plane plot of real and imaginary values is comprised of integral lengths along said real and imaginary axes defining substantial angular symmetry of Kernel function locations about an origin of said complex plane plot (e.g. Figures 5 and 8 wherein the point locations are symmetrically arrange respect to the axis).

Re claim 19, it is a radio receiver claim having similar limitations cited in claim 1. Thus, claim 19 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 20, White discloses in Figures 4-15 the approximated digitized Fourier transformation Kernel function receiver (e.g. abstract as FFT processing device) having: digitized approximated Kernel function value locations disposed adjacent a Kernel function map circle (e.g. Figure 5 and 8 wherein the Kernel function value locations are spread equally over the circle); said Kernel function map circle being of radius dimension expressible as a power of two units along an arbitrary measurement scale, a radius

dimension having a length from the numerical series of 1, 2, 4, 8, 16 and so-on units along said arbitrary measurement scale (e.g. Figures 5 and 8 wherein the radius is set to one); shift and add multiplication-susceptible integral unit lengths for each real and imaginary component of digitized Kernel function points in said Kernel function map (e.g. col. 4 lines 3-15 wherein the shift-add is utilizing in-place of multiplication for reducing complexity); substantially symmetrical digitized Kernel function point angular locations around said Kernel function map circle (e.g. Figure 8 wherein the weight/function points are located symmetrically along axis); digitized Kernel function point locations adjacent said Kernel function map circle being substantially optimized for shift multiplication algorithm implementation (e.g. col. 4 lines 3-15 wherein canonical operation is applied to optimize multiplication-less); and digitized Kernel function point locations adjacent said Kernel function map circle being substantially optimized for minimal approximation Kernel function spurious response generation with respect to adjacent possible approximation Kernel function locations (e.g. abstract and Figures 5-8, and col. 15 lines 10-20).

White fails to disclose a radio receiver is capable of a simple Kernel function realization and enhance multiple signal dynamic range with limited spurious response characteristics. However, the Tsui et al. disclose a radio receiver is capable of a simple Kernel function realization and enhance multiple signal dynamic range with limited spurious response characteristics (e.g. col. 2 lines 30-57).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add a radio receiver is capable of a simple Kernel

function realization and enhance multiple signal dynamic range with limited spurious response characteristics as seen in Tsui et al.'s invention into White's invention because it would enable to detecting and identifying incoming multiple signals from gigahertz radio frequency range (e.g. abstract and col. 2 lines 17-28).

Allowable Subject Matter

7. Claims 14-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 3-4 and 6-7 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

9. Applicant's arguments filed 11/01/2007 have been fully considered but they are not persuasive.

a. The applicant argues in page 8 last paragraph for all independent claims 1, 10, and 19-20 that the cited reference by White fails to disclose transformation realization in plural location as approximation rather than the precise Fourier transformation.

The examiner respectfully submits that Figures 5 and 8 of White's reference does disclose the transformation realization based on the locations within the circle distribution.

b. The applicant argues in page 9 first paragraph for claims that the cited reference by White fails to disclose the optimizing of Kernel function real-imaginary plane representations according to spurious response advantages in radio receiver as cited in the claimed.

The examiner respectfully submits that Figures 5 clearly disclose the optimization of Kernel function real-imaginary plane for radix 2-6 respectively representations according to spurious response advantages.

c. The applicant argues in page 9 second paragraph for claims that the cited reference by White fails to disclose 256 point FT and a plurality of intermediate size transformations.

The examiner respectfully submits that the independent claims do not require or limit the exact point of FT. Thus, 256 point FT and a plurality of intermediate size transformations are not required to be shown by the cited references.

d. The applicant argues in page 10 first paragraph for claims that neither of the references by White and Tsui et al. fails to disclose "the twiddle factor" or the associated square root of 3 factor in their algorithm.

The examiner respectfully submits that Figure 15 gamma of White's reference clearly disclose the associated square root of 3 factor in the algorithm.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (571) 272-3721. The examiner can normally be reached on M => F from 7:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do
Examiner
Art Unit 2193

December 15, 2007